TECHNICAL SPECIFICATION

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Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) —

Part 9:
Remote electronic tachograph monitoring (RTM)

Systèmes intelligents de transport — Cadre pour applications télématiques collaboratives pour véhicules de fret commercial réglementé (TARV) —

Partie 9: Monitorage du tachygraphe électronique à distance (RTM)

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2. www.iso.org/directives.

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The committee responsible for this document is ISO/TC 204, *Intelligent transport systems*

ISO 15638 consists of the following parts, under the general title *Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV)*:

— *Part 1 Framework and architecture*

— *Part 2: Common platform parameters using CALM*

— *Part 3: Operating requirements, 'Approval Authority' procedures, and enforcement provisions for the providers of regulated services*

— *Part 5: Generic vehicle information*

— *Part 6: Regulated applications* [Technical Specification]

— *Part 7: Other applications*

— *Part 8: Vehicle access monitoring (VAM)* [Technical Specification]

— *Part 9: Remote electronic tachograph monitoring (RTM)* [Technical Specification]

— *Part 10: Emergency messaging system/eCall (EMS)* [Technical Specification]

— *Part 11: Driver work records (work and rest hours compliance) (DWR)* [Technical Specification]

— *Part 12: Vehicle mass monitoring (VMM)* [Technical Specification]

— *Part 14: Vehicle access control (VAC)* [Technical Specification]

— *Part 15: Vehicle location monitoring (VLM)* [Technical Specification]

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— *Part 16: Vehicle speed monitoring (VSM)* [Technical Specification]

— *Part 17: Consignment and location monitoring (CLM)* [Technical Specification]

— *Part 18: ADR (Dangerous Goods) transport monitoring (ADR)* [Technical Specification]

— *Part 19: Vehicle parking facilities (VPF)* [Technical Specification]

— The following parts are under preparation:

— *Part 4: System security requirements* [Technical Specification]

— *Part 13: 'Mass' information for jurisdictional control and enforcement*

Introduction

Many ITS technologies have been embraced by commercial transport *operators (4.30)* and freight owners, in the areas of fleet management, safety and security. *Telematics (4.41)* applications have also been developed for governmental use. Such regulatory services in use or being considered vary from *jurisdiction (4.25)* to *jurisdiction*, but include electronic on-board recorders, digital *tachograph (4.40)*, on-board *mass (4.28)* monitoring, 'mass' data for regulatory control and management *(4.29)*, vehicle *access (4.1) methods*, *hazardous goods (4.21)* tracking and e-call *(4.17)*. Additional applications with a regulatory impact being developed include fatigue management, speed monitoring and heavy vehicle penalties imposed based on location, distance and time.

In such an emerging environment of regulatory and *commercial applications (4.12)*, it is timely to consider an overall *architecture (4.8)* (business and functional) that could support these functions from a single platform within a commercial freight vehicle that operates within such regulations. International Standards will allow for a speedy development and *specification (4.39)* of new applications that build upon the functionality of a generic specification platform. A suite of standards is required to describe and define the *framework (4.20)* and requirements so that the on board equipment and back office systems can be commercially designed in an open market to meet common requirements of *jurisdictions (4.25)*.

This suite of standards addresses and defines the *framework (4.20)* for a range of cooperative *telematics (4.41)* applications for *regulated vehicles (4.34)* [such as access methods, driver fatigue management, speed monitoring, on-board *mass (4.28)* monitoring, penalties and levies]. The overall scope includes the concept of operation, legal and regulatory issues, and the generic cooperative provision of services to *regulated vehicles (4.34)*, using an on-board ITS platform. The *framework* is based on a (multiple) *service provider (4.37)* oriented approach with provisions for the *approval (4.5)* and *auditing (4.9)* of *service providers*.

This suite of standards will:

- provide the basis for future development of cooperative *telematics (4.41)* applications for *regulated vehicles (4.34)*. Many elements to accomplish this are already available. Existing relevant standards will be referenced, and the *specifications (4.39)* will use existing standards (such as *CALM*) wherever practicable;
- allow for a powerful platform for highly cost-effective delivery of a range of *telematics* applications for *regulated vehicles (4.34)*;
- a business *architecture (4.8)* based on a (multiple) *service provider (4.37)* oriented approach;
- address legal and regulatory aspects for the *approval (4.5)* and *auditing (4.9)* of *service providers*.

This suite of standards deliverables is timely as many governments (Europe, North America, Asia and Australia/New Zealand) are considering the use of *telematics (4.41)* for a range of regulatory purposes. Ensuring that a single in-vehicle platform can deliver a range of services to both government and industry through open standards and competitive markets is a strategic objective.

This part of the ISO 15638 provides *specifications (4.39)* for remote tachograph monitoring.

NOTE 1   The definition of what comprises a 'regulated' vehicle is regarded as an issue for national decision, and may vary from *jurisdiction (4.25)* to *jurisdiction*. This suite of standards does not impose any requirements on nations in respect of how they define a *regulated vehicle (4.34)*.

NOTE 2   The definition of what comprises a 'regulated' service is regarded as an issue for national decision, and may vary from *jurisdiction (4.25)* to *jurisdiction*. This suite of standards does not impose any requirements on nations in respect of which services for *regulated vehicle*s *(4.34) jurisdictions* will require, or support as an option, but will provide standardised sets of requirements descriptions for identified services to enable consistent and cost efficient implementations where implemented.

Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) —

Part 9:
Remote electronic tachograph monitoring (RTM)

1　Scope

This part of ISO 15638 addresses the provision of *'Remote Tachograph Monitoring'* and specifies the form and content of such data required to support such systems, and access methods to that data.

This part of ISO 15638 provides *specifications (4.39)* for common communications and data exchange aspects of the *application service (4.2)* remote tachograph monitoring that a *regulator (4.35)* may elect to require or support as an option, including:

    a)　high level definition of the service that a s*ervice provider (4.37)* has to provide [the service definition describes common service elements, but does not define the detail of how such an *application service (4.2)* is instantiated, nor the acceptable value ranges of the data concepts defined];

    b)　means to realise the service;

    c)　application data, naming content and quality that an *IVS (4.22)* has to deliver.

The definition of what comprises a 'regulated' service is regarded as an issue for national decision, and may vary from *jurisdiction (4.25)* to *jurisdiction*. This part of ISO 15638 does not impose any requirements on nations in respect of which services for *regulated vehicle*s *(4.34) jurisdictions* will require, or support as an option, but provides standardized sets of requirements descriptions for identified services to enable consistent and cost efficient implementations where instantiated.

ISO 15638 has been developed for use in the context of regulated commercial freight vehicles (hereinafter referred to as 'regulated vehicles'). There is nothing, however, to prevent a jurisdiction extending or adapting the scope to include other types of regulated vehicles, as it deems appropriate.

2　Conformance

Requirements to demonstrate conformance to any of the general provisions or specific *application services (4.2)* described in this part of ISO 15638 shall be within the regulations imposed by the *jurisdiction (4.25)* where they are instantiated. Conformance requirements to meet the provisions of this part of ISO 15638 are therefore deemed to be under the control of, and to the specification of, the *jurisdiction* where the *application service*(s) is/are instantiated.

The protocols defined in this part of ISO 15638 have been independently tested. Annex A (Informative) provides results of these tests. In any conformance assurance process undertaken by candidate systems, where appropriate the results may be used as part of its process of conformance compliance.

3   Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 15638-1   *Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 1: Framework and architecture*

ISO 15638-2   *Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 2: Common platform parameters using CALM*

ISO 15638-3   *Intelligent transport systems — Framework for collaborative telematics applications for regulated commercial freight vehicles (TARV) — Part 3: Operating requirements, 'Approval Authority' procedures, and enforcement provisions for the providers of regulated services*

ISO 15638-4   *Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 4: System security requirements[1]*

ISO 15638-5   *Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 5: Generic vehicle information*

ISO/TS 15638-6   *Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 6: Regulated applications*

4   Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 15638-1 and the following apply.

4.1
app
small (usually) *Java™ (4.24)* applets, organized as software bundles, that support *application services (4.2)* by keeping the *data pantry (4.14)* provisioned with up-to-date data

4.2
application service
service provided by a *service provider (4.37)* enabled by accessing data from the *IVS (4.22)* of a *regulated vehicle (4.34)* via a wireless communications network

4.3
application service provider
ASP
party that provides an *application service (4.2)*

4.4
app library
separately secure area of memory in *IVS (4.22)* where apps are stored [with different access controls to *data pantry (4.14)*]

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1   Under preparation.

4.5
approval
formal affirmation that an applicant has satisfied all the requirements for appointment as an *application service provider (4.3)* or that an application service delivers the required service levels

4.6
approval agreement
written agreement made between an *approval authority (regulatory) (4.7)* and a *service provider (4.37)*

NOTE   An *approval authority (regulatory) (4.7)* approval agreement recognizes the fact that a *service provider (4.37)*, having satisfied the *approval authority's* requirements for appointment as a *Service provider*, is appointed in that capacity, and sets out the legal obligations of the parties with respect to the on-going role of the *service provider.*

4.7
approval authority (regulatory)
organization (usually independent) which conducts *approval (4.5)* and ongoing *audit (4.9)* for *service providers (4.37)* on behalf of a *jurisdiction (4.25)*

4.8
architecture
formalized description of the design of the structure of *TARV* and its *framework (4.20)*

4.9
audit/auditing
review of a party's capacity to meet, or continue to meet, the initial and ongoing *approval agreements (4.6)* as a *service provider (4.37)*

4.10
basic vehicle data
data that shall be maintained/provided by all *IVS (4.22)*, regardless of *jurisdiction (4.25)*

4.11
CALM communications access for land mobiles
layered solution that enables continuous or quasi continuous communications between vehicles and the infrastructure, or between vehicles, using such (multiple) wireless telecommunications media that are available in any particular location, and which have the ability to migrate to a different available media where required and where media selection is at the discretion of *user (4.42)* determined parameters by using a suite of standards based on ISO 21217 (*CALM* architecture) and ISO 21210 (*CALM* networking) that provide a common platform for a number of standardized media using *ITS-stations (4.23)* to provide wireless support for applications, such that the application is independent of any particular wireless medium

4.12
commercial application(s)
ITS applications in *regulated vehicles (4.34)* for commercial (non-regulated) purposes

EXAMPLE   Asset tracking, vehicle and engine monitoring, cargo security, driver management, etc.

4.13
core data
basic vehicle data (4.10) plus any additional data required to provide an implemented *regulated application service (4.33)*

4.14
data pantry
secure area of memory in *IVS (4.22)* where data values are stored [with different access controls to *app library (4.4)*]

4.15
driver
person driving the *regulated vehicle* at any specific point in time

4.16
driver work records
DWR
collection, collation, and transfer of *driver (4.15)* work and rest hours data from an *in-vehicle system (4.22)* to an *application service provider (4.3)*

4.17
eCall
specialized instantiation of an *EMS (4.18)* that provides incident messaging and communication with a public service assistance point via priority wireless telephone communications using its emergency call capabilities

4.18
emergency message system
EMS
collection, collation, and transfer of emergency message data from an *in-vehicle system (4.22)* to an *application service provider (4.3)*

4.19
facilities
layer that sits on top of the communication stack and helps to provide data interoperability and reuse, and to manage applications and enable dynamic real time loading of new applications

4.20
framework
particular set of beliefs, ideas referred to in order to describe a scenario or solve a problem

4.21
hazardous goods
HAZMAT
see *dangerous goods (4.32)*/*Accord européen relatif au transport international des marchandises Dangereuses par Route (ADR) (4.6)*

4.22
in-vehicle system
IVS
ITS-station (4.23) and connected equipment on board a vehicle

4.23
ITS-station
ITS-s
entity in a communication network, comprised of application, *facilities (4.19)*, networking and access layer components specified in ISO 21217 that operate within a bounded secure management domain

4.24
Java™
object oriented open source operating language developed by SUN systems

4.25
jurisdiction
government, road or traffic authority which owns the r*egulatory applications (4.32)*

EXAMPLE   Country, state, city council, road authority, government department (customs, treasury, transport), etc.

4.26
jurisdiction regulator
agent of the *jurisdiction (4.25)* appointed to regulate and manage *TARV* within the domain of the *jurisdiction*

NOTE   This may or may not be the approval authority (regulatory) (4.7).

4.27
local data tree
LDT
frequently updated data concept stored in the on-board *data pantry (4.14)* containing a collection of data values deemed essential for either a) *TARV regulated application service (4.33)*, or b) *cooperative intelligent transport systems (4.30)*

4.28
mass
mass of a given heavy vehicle as measured by equipment affixed to the *regulated vehicle (4.34)*

4.29
'mass' data for regulatory control and management
MRC
collection, collation, and transfer of vehicle *mass (4.28)* data from an *in-vehicle system (4.22)* to an *application service provider (4.3)* to enable data provision to *jurisdictions (4.25)* for the control and management of equipped vehicles based on the *mass* of the *regulated vehicle (4.34),* or use of such data to enable compliance with the provisions of regulations

4.30
operator
fleet manager of a *regulated vehicle (4.34)*

4.31
prime service provider
service provider (4.37) who is the first contractor to provide *regulated application services (4.33)* to the *regulated vehicle (4.34),* or a nominated successor on termination of that initial contract

NOTE   The *prime service provider (4.31)* is also responsible for maintaining the installed *IVS (4.22)*; if the *IVS* was not installed during the manufacture of the vehicle, the *prime service provider (4.31)* is also responsible for installing and commissioning the *IVS (4.22).*

4.32
regulated/regulatory application
application arrangement using TARV utilized by *jurisdictions (4.25)* for granting certain categories of commercial vehicles rights to operate in regulated circumstances subject to certain conditions, or indeed to permit a vehicle to operate within the *jurisdiction*

NOTE   This may be mandatory or voluntary at the discretion of the *jurisdiction.*

4.33
regulated application service
TARV application service to meet the requirements of a regulated application that is mandated by a regulation imposed by a *jurisdiction (4.25),* or is an option supported by a *jurisdiction*

4.34
regulated vehicle
vehicle that is subject to regulations determined by the *jurisdiction (4.25)* as to its use on the road system of the *jurisdiction* in regulated circumstances, subject to certain conditions, and in compliance with specific regulations for that class of regulated vehicle

NOTE   At the option of *jurisdictions*, this may require the provision of information via *TARV* or provide the option to do so.

4.35
regulator
see jurisdiction regulator (4.26)

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4.36
remote tachograph monitoring
RTM
collection, collation, and transfer of data from an on-board electronic *tachograph (4.40)* system to an
application service provider (4.3)

4.37
service provider
party which is certified by an approval *authority (regulatory) (4.7)* as suitable to provide regulated or
commercial ITS *application services (4.2)*

4.38
session
wireless communication exchange between the *ITS-station (4.23)* of an *IVS (4.22)* and the *ITS-station* of its
application service provider (4.3) to achieve data update, data provision, upload apps, or otherwise manage
the provision of the *application service (4.2),* or a wireless communication provision of data to the *ITS-station* of
an *IVS (4.22)* from any other *ITS-station*

4.39
specification
explicit and detailed description of the nature and functional requirements and minimum performance of
equipment, service or a combination of both

4.40
tachograph
sender unit mounted to a vehicle gearbox, a tachograph head and a digital driver card, which records the
regulated vehicle (4.34) speed and the times at which it was driven and aspects of the *driver's (4.15)* activity
selected from a choice of modes

4.41
telematics
use of wireless media to obtain and transmit (data) from a distant source

4.42
user
individual or party that enrols in and operates within a regulated or *commercial application (4.12) service (4.2)*

EXAMPLE   D*river (4.15),* transport *operator (4.30),* freight owner, etc.

4.43
vehicle access control
VAC
control of *regulated vehicle'*s ingress to and egress from controlled areas and associated penalties and levies

4.44
vehicle access management
VAM
monitoring and management of *regulated vehicle*s approaching or within sensitive and controlled areas

4.45
vehicle location monitoring
VLM
collection, collation, and transfer of vehicle location data from an *in-vehicle system (4.22)* to an *application
service provider (4.3)*

4.46
vehicle mass monitoring
VMM
collection, collation, and transfer of vehicle *mass (4.28)* data from an *in-vehicle system (4.22)* to an *application
service provider (4.3)*

4.47
vehicle parking facilities
VPF
system for booking and *access (4.1)* to and egress from a *vehicle parking facility (VPF) (4.47)*

4.48
vehicle speed monitoring
VSM
collection, collation, and transfer of vehicle speed data from an *in-vehicle system (4.22)* to an *application service provider (4.3)*

5   Symbols and abbreviated terms

ADR
Accord européen relatif au transport international des marchandises Dangereuses par Route (4.6) [*dangerous goods (4.32)*]

app
applet (JAVA^{TM} application or similar) *(4.1)*

AS
application service

ASP
application service provider (4.3)

CALM
communications access for land mobiles (4.11)

CAN
controller area network (4.20)

DWR
driver work records (4.16)

EMS
emergency message system (4.18)

ID
identity

ITS-S
ITS station (4.23)

IVS
In-vehicle system (4.22)

LDT
local data tree (4.27)

MRC
'mass' data for regulatory control and management (4.29)

RTM
remote tachograph monitoring (4.36)

SE
service element

SPS
standard positioning service (NAVSTAR)

TARV
telematics (4.41) applications for *regulated vehicles (4.34)*

VAC
vehicle access control (4.43)

VAM
vehicle access management (4.44)

VLM
vehicle location monitoring (4.45)

VMM
vehicle mass monitoring (4.46)

VPF
vehicle parking facility (4.47)

VSM
vehicle speed monitoring (4.48)

6   General overview and framework requirements

ISO TS 15638-1 provided a *framework (4.20)* and *architecture (4.8)* for *TARV*. It provided a general description of the roles of the actors in *TARV* and their relationships.

To understand clearly the *TARV* framework, *architecture (4.8)* and detail and *specification (4.39)* of the roles of the actors involved, the reader is referred to ISO TS 15638-1.

ISO TS 15638-6 provides the core requirements for all regulated applications. To understand clearly the general context in to which the provision of this application service, the reader is referred to ISO TS 15638-6.

In order to be compliant with this part of ISO 15638, the overall architecture employed shall comply to ISO 15638-1.

In order to be compliant with this part of ISO 15638, the communications employed shall comply to ISO 15638-2.

In order to be compliant with this part of ISO 15638, the operating requirements employed shall comply to ISO 15638-3.

In order to be compliant with this part of ISO 15638, the security employed shall comply to ISO 15638-4[2].

In order to be compliant with this part of ISO 15638, the basic vehicle data shall comply to ISO 15638-5.

In order to be compliant with this part of ISO 15638, the generic conditions for this application service shall comply to ISO 15638-6.

ISO 15638 has been developed for use in the context of regulated commercial freight vehicles. There is nothing however to prevent a jurisdiction extending or adapting the scope to include other types of regulated vehicles, as it deems appropriate.

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[2]   Under preparation.

7 Requirements for services using generic vehicle data

The means by which the access commands for generic vehicle information specified in ISO 15638-5 can be used to provide all or part of the data required in order to support a *regulated application service (4.33)* shall be as defined in ISO 15638-6.

8 Application services that require data in addition to basic vehicle data

8.1 General

Shall be conducted as defined in ISO 15638-6.

8.2 Quality of service requirements

This part of ISO 15638 contains no general requirements concerning quality of service. Such aspects shall be determined by a *jurisdiction (4.25)* as part of its *specification (4.39)* for any particular *regulated application service (4.33)*. However, where a specified *regulated application service (4.33)* has specific Q of S requirements essential to maintain interoperability, these aspects shall be as specified in Clause 10*.*

8.3 Test requirements

This part of ISO 15638 contains no general requirements concerning test requirements. Such aspects shall be determined by a *jurisdiction (4.25)* as part of its *specification (4.39)* for any particular *regulated application service (4.33),* and issued as a formal test requirements *specification (4.39)* document. However, where a specified *regulated application service (4.33)* has specific test requirements essential to maintain interoperability, these aspects shall be as specified in Clause 10 relating to this *regulated application service,* or in a separate standards document referenced within that Clause. And where multiple *jurisdictions* recognise a benefit to common test procedures for a specific *regulated application service,* this shall be the subject of a separate standards document.

8.4 Marking, labelling and packaging

This part of ISO 15638 has no specific requirements for marking labelling or packaging.

However, where the privacy of an individual may be potentially or actually compromised by any instantiation based on the ISO 15638 family of Standards, the contracting parties shall make such risk explicitly known to the implementing *jurisdiction (4.25)* and shall abide by the privacy laws and regulations of the implementing *jurisdiction* and shall mark up or label any contracts specifically and explicitly drawing attention to any loss of privacy and precautions taken to protect privacy. Attention is drawn to ISO TR 12859 in this respect.

9 Common features of regulated TARV application services

9.1 General

The details of the instantiation of *regulated application service (4.33)* are as designed by the application service system to meet the requirements of a particular *jurisdiction (4.25)* and are not defined herein. ISO 15638-6 specifies the generic roles and responsibilities of actors in the systems, and instantiations that claim compliance with this part of ISO 15638 shall also be compliant with the requirements of ISO 15638-6.

The means by which data is provisioned into the *data pantry (4.14)*, and the means to obtain the *TARV LDT (4.27)* and *core data (4.13)* are described in Clause 8 of ISO 15638-6.

In order to minimise demand on the *IVS (4.22)* (which it is assumed will be performing multiple *application services (4.2)* simultaneously, as well as supporting general safety related cooperative vehicle systems), and

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because national requirements and system offerings will differ, a 'cloud' approach has been taken in defining *TARV regulated application services (4.33)*.

The *TARV* approach is for the on-board *app (4.1)* supporting the application service to collect and collate the relevant data, and at intervals determined by the *app,* or on demand from the *application service provider (4.3)(ASP),* pass that data to the *ASP.* All of the actual application service processing shall occur in the mainframe system of the *ASP* (in the 'cloud').

For further information see Clause 9 of ISO 15638-6.

At a conceptual level, The *TARV* system is therefore essentially simple, as shown in Figure 1. The process is similar to that for CoreData, but data is supplied to a different on-board file in the *data pantry (4.14)*.
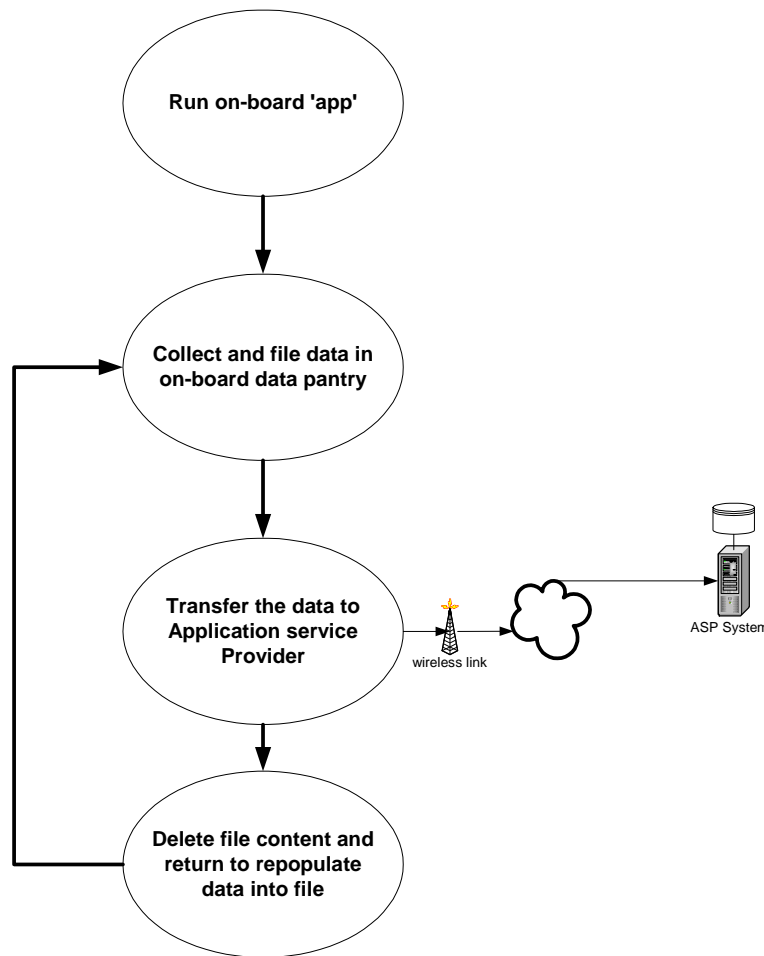
Figure 1 — TARV Regulated application service on-board procedure

At a common generic functional level for this application service, the process may be seen as shown in Figure 2 below, however the connected equipment may/may not be required in all cases.

9.2   Common role of the jurisdiction, approval authority, service provider and user

The Common role of the jurisdiction, approval authority, application service provider and user shall be as defined in ISO 15638-6.

9.3 Common characteristics for instantiations of regulated application services

The common characteristics for instantiations of regulated application services shall be as defined in ISO 15638-6.

9.4 Common sequence of operations for regulated application services

The Common sequence of operations for regulated application services shall be as defined in ISO 15638-6.

9.5 Quality of service

Generic quality of service provisions for *application services (4.2)* shall be as defined in ISO 15638-6.

9.6 Information security

Information security shall be as defined in ISO 15638-6.

9.7 Data naming content and quality

Data naming and quality shall be as defined in ISO 15638-5 sublauses 8.2, 8.3 and 8.4.

Variations specific to the remote tachograph monitoring *application service (4.2)* shall be as defined below.

9.8 Software engineering quality systems

Software engineering quality systems shall be as defined in ISO 15638-6.

9.9 Quality monitoring station

The availability of quality monitoring stations shall be as defined in ISO 15638-6.

9.10 Audits

Audits shall be as defined in ISO 15638-6.

9.11 Data access control policy

To protect the data and information held by the *application service provider (4.3),* each provider shall adopt a risk based data access control policy for employees of the provider.

9.12 Approval of IVSs and service providers

Generic provisions for the *approval* of *IVSs* and *service providers (4.37)* shall be as specified in ISO 15638-3 (*TARV* –Operating requirements, approval procedures, and enforcement provisions for the providers of regulated services). Detailed provisions for specific *regulated applications (4.32)* shall be as specified by the regime of the *jurisdiction (4.25).*

10 Remote tachograph monitoring (RTM)

10.1 TARV RTM service description and scope

10.1.1 TARV RTM use case
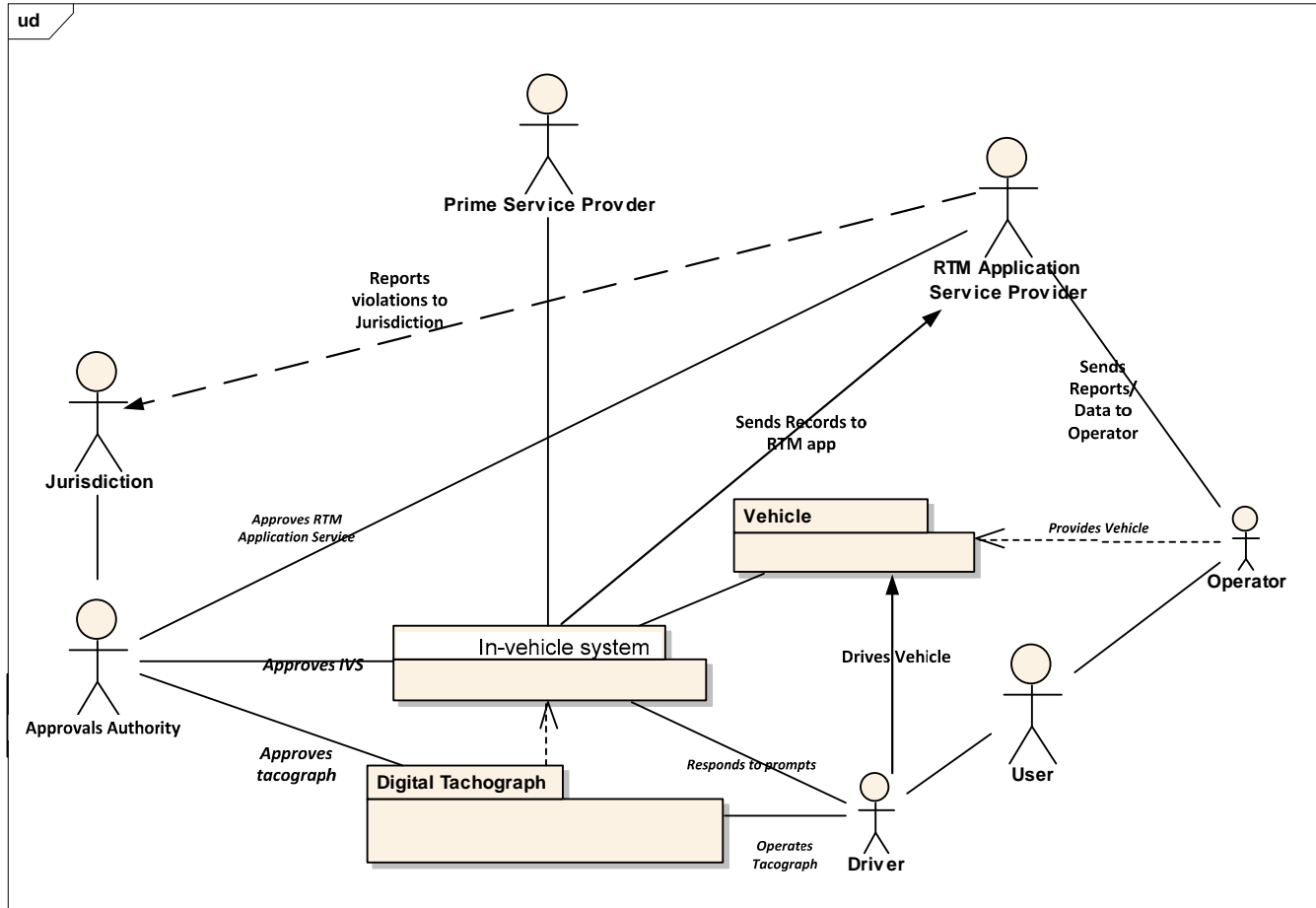
Figure 2 — Remote tachograph monitoring use case

Figure 2 provides an illustration of a *TARV* remote *tachograph (4.40)* (*RTM*) monitoring system. This application service is described in 10.1.2 and 10.1.3 below.

10.1.2 Description of TARV RTM regulated application service

TARV RTM is a means to deliver a data concept containing digital *tachograph (4.40)* data to an *application service provider (4.3)* using the *TARV IVS (4.22)* and a wireless communication interface between the *IVS* and the *application service provider (4.3)* central system.

This part of ISO 15638 does NOT specify any of the precise content of the *tachograph (4.40)* data concept transferred which shall be at the determination of the *jurisdiction (4.25).*

This part of ISO 15638 provides only the 'black box' data concept 'RTMdata' containing digital *tachograph (4.40)* data, so is not applicable for analogue *tachograph* equipment/systems. International, Regional and National Requirements regulations and standards determine the content of electronic *tachograph* data.

EXAMPLE   In Europe, EU regulation 1360/2002 (Recording equipment in road transport) provides the requirements in countries of the European Union for digital *tachograph (4.40)* equipment, and combined with Regulation 561/2006/EC of

the European Union (driving and rest times of professional *drivers (4.15)*) provides the regime for *driver* monitoring in Nation states within its *jurisdiction (4.25)*.

The exact nature and form of the requirements and reports will vary from instantiation to instantiation, and such detail is not standardised in this part of ISO 15638. This part of ISO 15638 specifies the basic *architecture (4.8)* and basic information needed to support this type of application service using *TARV*, so that the *in-vehicle system (4.22)* can satisfy the requirements of any likely instantiation by a different *jurisdiction (4.25)* /*application service provider (4.3),* or so that the *regulated vehicle (4.34)* and equipment can support the different requirements of different *jurisdictions* when the *regulated vehicle* and *driver (4.15)* are operating within their domain.

Tachograph (4.40) regulations differ around the world and are not specified herein, but in order for *TARV RTM* to operate it is a requirement that at least the following features are present in the digital *tachograph*:

   a) The digital *tachograph* shall be able to output the following data using an appropriate dedicated serial link independent from an optional *CAN bus (4.20)* connection (ISO 11898 Road vehicles — Interchange of digital information — Controller Area Network (*CAN*) for high speed communication), to allow their processing by other electronic units installed in the *regulated vehicle (4.34)*

   b) When the ignition of the *regulated vehicle* is ON, key tachograph data (as determined by the digital *tachograph* system design) is permanently broadcast to the *IVS (4.22);*

   c) When the ignition of the *regulated vehicle (4.34)* is OFF, at least any change of *driver (4.15)* or co-*driver* activity and/or any insertion or withdrawal of a *tachograph* card shall generate a corresponding data output. In the event that data output has been withheld whilst the ignition of the *regulated vehicle* is OFF, that data shall be made available once the ignition of the vehicle is ON again.

   d) Data stored into the data memory shall not be affected by an external power supply cut-off of less than twelve months in type approval conditions.

   e) Notwithstanding that the data to be transferred shall be a function of system design and regulatory requirements and is not determined in this part of ISO 15638, the recording equipment shall be able to store in its data memory the following vehicle unit identification data:

   – name of the manufacturer

   – address of the manufacturer

   – part number

   – serial number

   – software version number

   – software version installation date

   – year of equipment manufacture

   – approval number

   – length, in bytes (octets) of 'RTMdata' file

   f) The data stored in its data memory shall be made accessible to the *IVS (4.22)* and the *TARV RTM app (4.1)* in a standard and declared format.

Figure 2 provides an illustration of a *TARV* remote digital tachograph monitoring system. This application service is described in 10.1.3 and 10.2 below.

10.1.3 Description of TARV RTM application service

The *TARV* remote tachograph monitoring (*RTM*) application service may exhibit itself in a number of different forms in different *jurisdictions (4.25)*. In each case the use case shown in Figure 2 may vary slightly and is therefore an example, not a requirement. It is likely to be named differently according to its origin and the regulatory environment in which it is instantiated.

The exact nature and form of the requirements and reports will vary from instantiation to instantiation, and such detail is not standardised in this part of ISO 15638. This part of ISO 15638 specifies the basic

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architecture (4.8) and information needed to support this type of application service using *TARV*, so that the *in-vehicle system (4.22)* can satisfy the requirements of any likely instantiation by a different *jurisdiction (4.25)* /*application service provider (4.3),* or so that the *regulated vehicle (4.34)* and equipment can support the different requirements of different *jurisdictions* when the *regulated vehicle (4.34)* and *driver (4.15)* are operating within their domain.

Figure 2 above shows an example use case appropriate where reports are required by the *jurisdiction (4.25)* and where compliance is also monitored such that transgression may result in an offense/prosecution, perhaps the most comprehensive example of the *TARV RTM application service (4.2).*

10.2 Concept of operations for TARV RTM

10.2.1 General

TARV remote tachograph monitoring (*RTM*) is an application service that transfers digital *tachograph (4.40)* data from a vehicle to an *application service provider (4.3)* using a *TARV IVS (4.22)* and a wireless communication interface. The application service does not define or control the content of the *tachograph* data.

10.2.2 Statement of the goals and objectives of the TARV RTM system

The objective is to provide data from an on-board digital *tachograph (4.40)* to an *application service provider (4.3).*

The service is achieved by an *app (4.1)* in the *IVS (4.22)* requesting *tachograph (4.40)* data from the digital *tachograph*, storing the data in a uniquely identified file, and sending the data as determined in the *app* (at defined intervals or on demand from the *application service provider (4.3)* system). Principal provision of the application service is provided by the landside application system, and the on-board application is a means of feeding data to that landside system, and may on occasions receive data from the landside based application service system.

10.2.3 Strategies, tactics, policies, and constraints affecting the TARV RTM system

The principle issues affecting the system are those of collecting data from an unspecified device.

This application service restricts itself to providing a medium to transfer (unspecified) data from an on-board device to the *application service provider (4.3)* using the *TARV IVS (4.22)*. It does not design the *application service (4.2)*. That is left to the *jurisdiction (4.25),* the *application service provider,* and *approval authority (regulatory) (4.7)*.

The *IVS (4.22)* is a device of limited capability, and will be expected to be multi-tasking with other *TARV* 'apps' and also conducting non-*TARV* cooperative vehicle system apps at the same time. It is therefore important that the *IVS* is not overloaded by a complicated *TARV RTM app (4.1).*

10.2.4 Organisations, activities, and interactions among participants and stakeholders of TARV RTM

It should be noted that an entity may perform multiple roles and in doing so takes on the responsibility to perform the functions described under those roles.

10.2.5 Clear statement of responsibilities and authorities delegated for TARV RTM

Table 1 provides a list of the actors involved, their activities and interactions.

Table 1 — TARV RTM actors involved, their activities and interactions

ACTOR	ROLE	ACTIVITIES	INTERACTIONS
Jurisdiction **(J)** *(4.25)*	Sets requirements for mandatory and supported *TARV RTM*	Publishes *specifications (4.39)*	ALL
		Obtains regulations	ALL: Establish regime and regulations PSP:Register *ASP* Register, receive reports Op: Vehicle Registration Dr: Licence, issue *Tachograph*
		May provide *Tachographs (4.40)*	
		Appoints *Approval Authority*	CA: Contract. Instruct. Receive reports
		Monitors reports	AJ: Employ, process enforcement
		Instigates enforcement	
Approval authority (CA) *(4.7)*	Implements *jurisdiction* policy at equipment and service approval level	Certifies *IVS (4.22)*, *Tachograph*, *Application Service (4.2)* instantiations	PSP: Certify *IVS* *ASP* : Certify *Application Service* Op: Certify *Tachograph*
		Conducts Q of S maintenance to instruction of *jurisdiction*	
Agent of *jurisdiction* (AJ) *(4.25)*	Inspection and Enforcement	Inspects *Tachographs*	Dr: Inspections
		Instigates enforcement actions	Dr: Enforcement Op: Enforcement
Prime service provider **(PSP)** *(4.31)*	Responsibility for *IVS*	Installs and/or commissions *IVS*	CA: May Apply to certify *IVS* Op; Installation
		Maintains *IVS*	Op: Maintain *IVS*
		May provide *Tachographs*	
Application service provider **(ASP)** *(4.3)*	Provides *TARV RTM (4.36) application services (4.2)*	Develops instantiation of *TARV RTM* application service	CA : Applies for approval of Service
		Contracts with *users (4.42)*	Op: Contracts
		Provides *TARV RTM* application service to *users* and *jurisdiction*	Op: Provides service Dr: May provide service J: Provides service/reports AJ: re enforcement
operator **(Op)** *(4.30)*	Provides *regulated vehicle (4.34)*	'Employs'/contracts *drivers*	Dr:Employs/Contracts
	Uses *regulated vehicle* for commerce and logistics	Operates *regulated vehicle*	J: Registers *regulated vehicle* PSP: Contracts,receives service (install/maintain) *ASP* :Contracts, receives service
		Receives reports from *ASP*	
Driver (Dr) *(4.15)*	Drives *regulated vehicle* to instruction of *operator (4.30)*		Op: to instructions
		Sings into *TARV RTM* system	IVS: signs *driver* into system
		Drives *regulated vehicle*	
		Interfaces with AJ	AJ: Provides *Access* to *Tachograph*

10.2.5.1   The *jurisdiction (4.25)* shall be responsible for the regime and regulations.

10.2.5.2   The *jurisdiction (4.25)* shall employ a *approval authority (regulatory) (4.7)* or otherwise provide its function.

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10.2.5.3 The *jurisdiction (4.25)* shall provide means for enforcement (where required) to meet the requirements of the regime of the *jurisdiction.*

10.2.5.4 The *prime service provider (4.31)* shall install/commission *IVS (4.22)* and maintain the *IVS.*

10.2.5.5 The *prime service provider (4.31)* shall install/commission *tachograph (4.40)* and maintain the *tachograph*

10.2.5.6 The *application service provider (4.3)* (*ASP*) shall develop the *TARV RTM* application service or use an *TARV RTM* application service provided by *jurisdiction (4.25).*

10.2.5.7 The *application service provider (4.3)* shall obtain any required *approval (4.5)* of its *TARV RTM* service from the *approval authority (regulatory) (4.7).*

10.2.5.8 The *application service provider (4.3)* shall contract with the *user (4.42)* (normally *operator (4.30)* but in some instantiations also with *driver (4.15)*).

10.2.5.9 The *application service provider (4.3)* shall be responsible to provide the application service to *jurisdiction (4.25), operator (4.30)* and *driver (4.15)* as specified in its service offering.

10.2.5.10 The *operator (4.30)* shall be responsible to provide the *regulated vehicle (4.34).*

10.2.5.11 The *operator (4.30)* shall be responsible to abide by requirements of the regime re *TARV RTM.*

10.2.5.12 The *operator (4.30)* shall be responsible to pay levies required by *jurisdiction (4.25), prime service provider (4.31)* and *application service provider (4.3).*

10.2.5.13 The *driver (4.15)* shall be responsible to follow instructions, including use of digital *tachograph (4.40).*

10.2.6 Equipment required for TARV RTM

10.2.6.1 TARV IVS

10.2.6.1.1 The system shall be designed to work using *TARV IVS (4.22)* as defined in the ISO 15638 suite of standards documents.

10.2.6.1.2 The *IVS (4.22)* shall be provided with an interface capable of receiving data from the installed *tachograph (4.40)*, and the *tachograph* shall have the means to provide data to the *IVS* for transfer to the *application service provider (4.3).* That transfer may be 'pushed' by the digital *tachograph* or 'pulled' from the digital *tachograph* according to the design of the digital *tachograph* and the *TARV RTM app (4.1)* in the *IVS*, and is a function of the application service design, and not the *specifications (4.39)* of this part of ISO 15638.

10.2.6.1.3 The *prime service provider (4.31)* / *application service provider (4.3)* shall provide to the *approval authority (regulatory) (4.7)*, evidence of compliance from an appropriate body to demonstrate the suitability for use in vehicles for the *IVS (4.22)*, *tachograph (4.40)* and all associated components.

10.2.6.1.4 It shall not be possible for collected or stored remote *tachograph (4.40)* monitoring data or remote *tachograph* monitoring in any software or non volatile memory within the *IVS (4.22)* to be accessible or capable of being manipulated by any person, device or system, other than that authorised by the *application service provider (4.3).*

10.2.6.2 TARV RTM 'app'

10.2.6.2.1 The digital *tachograph (4.40)* shall supply data to the *IVS (4.22)*. This may be 'pushed' at the instigation of the digital *tachograph*, or 'pulled' at the instigation of the *TARV RTM app (4.1)* according to the design of the equipment and *app* software and is a matter for commercial design decision or the requirements of the regime of the *jurisdiction (4.25).*

10.2.6.2.2 The *TARV RTM app (4.1)* running on the *IVS (4.22)* records the received *tachograph (4.40)* data in a file, '`RTMData`' held in the *data pantry (4.14)* of the *IVS*.

10.2.6.2.3 At intervals determined by the certified application service system *specification (4.39)*, the *TARV RTM app (4.1)* shall send the *TARV RTM* data held in the file, '`RTMData`' held in the *data pantry (4.14)* of the *IVS (4.22)* to the *TARV RTM* system of the *application service provider (4.3)* via its most appropriate wireless communications interface.

10.2.6.2.4 Once the *TARV RTM* system of the *application service provider (4.3)* has acknowledged successful receipt of the data, the '`RTMData`' file shall be deleted from the memory of the *IVS (4.22)* unless the *user (4.42)* or *application service provider* requires it for other purposes, and a new file shall be created for future use.

10.2.6.2.5 It shall not be possible for collected or stored *tachograph (4.40)* data in any software or non volatile memory within the *IVS (4.22)* or digital *tachograph* to be accessible or capable of being manipulated by any person, device or system (including via any self declaration device), other than that authorised by the *application service provider (4.3)*.

10.2.6.3 Tachograph

The *tachograph (4.40)* shall be to a design approved by the *jurisdiction (4.25)*. The operation of the *tachograph* is outwith the scope of this part of ISO 15638.

10.2.7 Operational processes for the TARV RTM system

Shall be as defined in 9.2.

For detail of the operational processes See10.3 (sequence of operations for remote digital *tachograph (4.40)* monitoring) and Figure 10.2.

10.2.8 Role of the jurisdiction for TARV RTM

Shall be as defined in 9.3.

10.2.9 Role of the TARV RTM prime service provider

Shall be as defined in 9.4.

10.2.10 Role of the TARV RTM application service provider

Shall be as defined in 9.5.

10.2.11 Role of the TARV RTM user

Shall be as defined in 9.6.

10.2.12 Generic characteristics for all instantiations of the TARV remote tachograph monitoring (RTM) application service

10.2.12.1 A remote *tachograph (4.40)* monitoring application service is approved; it utilises a *TARV IVS (4.22)* which communicates to the *prime service provider (4.31)* / *application service provider (4.3)* and has the ability to obtain data from the *regulated vehicle (4.34)* digital *tachograph*.

10.2.12.2 The *application service provider (4.3)* shall load a *TARV RTM App (4.1)* into the *IVS (4.22)* of the *operator's (4.30)* vehicles.

10.2.12.3 The *TARV RTM App (4.1)* shall run whenever the *regulated vehicle (4.34)* is operating.

10.2.12.4   The *TARV RTM App (4.1)* shall record the data specified in its *app* in the *IVS (4.22)*

10.2.12.5   The *application service provider (4.3)* shall design/install/operate its remote tachograph monitoring system as approved by the *approval authority (regulatory) (4.7)*.

10.2.12.8   The *IVS (4.22)* shall provide its *TARV RTM* data to the *application service provider (4.3)* using the *TARV IVS* wireless link at least once every 24 hours.

Every transfer shall include framing data that identifies its sequential order, IVS ID, version number of *IVS (4.22)* and version number of the *TARV RTM app (4.1)*.

The system shall acknowledge receipt of the data via the *TARV IVS (4.22)* wireless link. Once the data has been acknowledged it shall be deleted from the *IVS* memory unless the *operator (4.30)* or *ASP (4.3)* chooses to retain it in the *IVS* memory for other openly declared purposes with the assent of the user.

10.2.12.9   The application service system shall retain and back up the *TARV RTM* data to the requirements of the *jurisdiction (4.25)*.

10.2.12.10   The *application service provider (4.3)* shall provide reports to the *jurisdiction (4.25)* or its agents as specified and required by the *jurisdiction* when approving the product.

10.2.12.11   *TARV RTM* records received by the *IVS (4.22)* and stored in the '`RTMData`' file held in the *data pantry (4.14)* of the *IVS* are sent to the *application service provider (4.3)*. The *application service provider* is responsible to provide the service to the *regulated vehicle (4.34) operator (4.30)*, and in the event of contravention, to the *jurisdiction (4.25)*, in accordance with the regime of the *jurisdiction.*

10.3 Sequence of operations for TARV RTM

10.3.1   General

The business process and sequence of operations is shown in Figure 3.

```
┌ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┐      ┌ ─ ─ ─ ─ ─ ─ ─ ┐      ┌───────────────┐
   Approve RTM system          Approve IVS              Approve Digital
                                                          Tachograph
└ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┘      │               │      └───────────────┘
                              Install IVS and
                              Digital Tachograph
                              └ ─ ─ ─ ─ ─ ─ ─ ┘
```
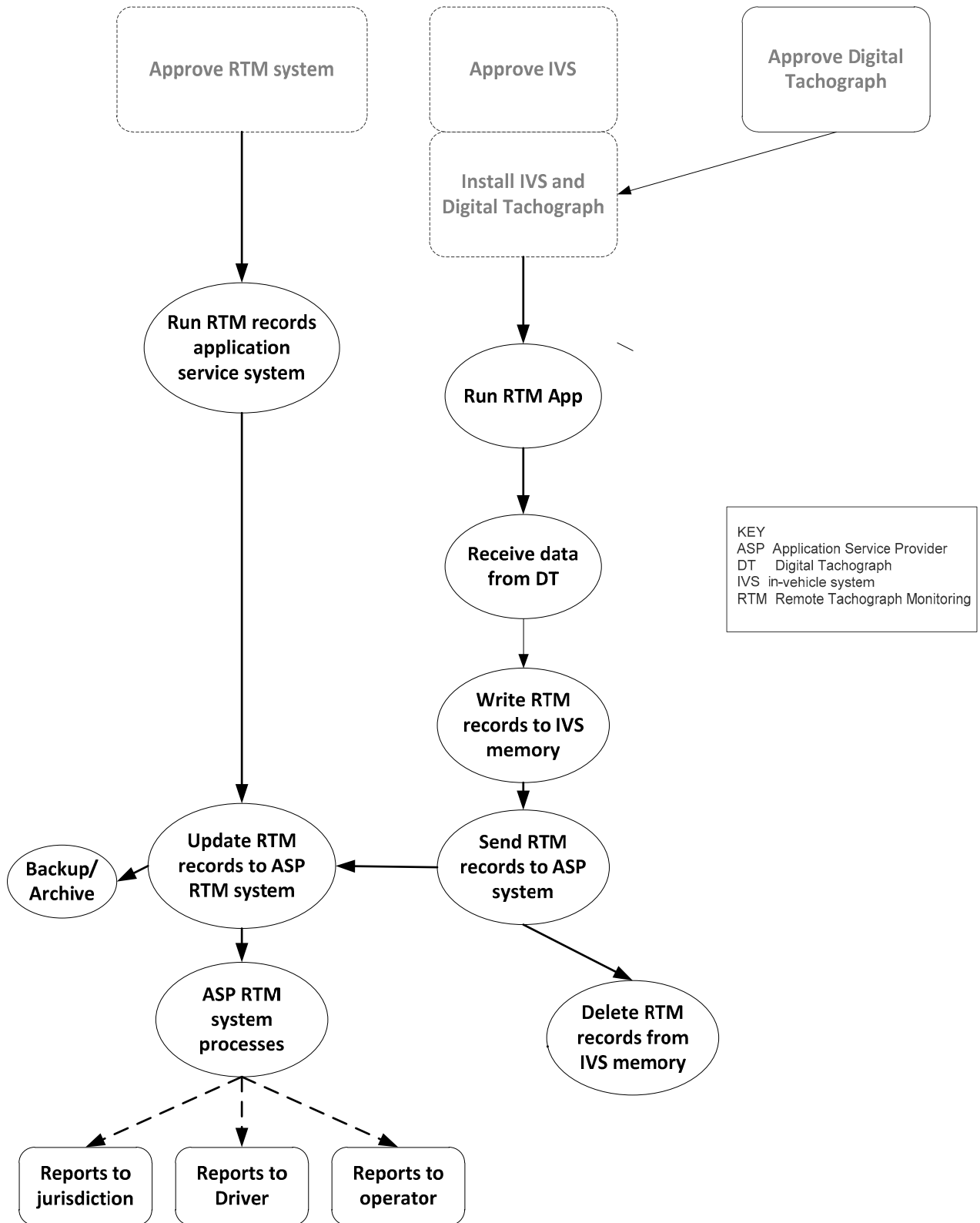
Figure 3 — TARV RTM Business process and procedure

KEY
ASP Application Service Provider
DT   Digital Tachograph
IVS   in-vehicle system
RTM Remote Tachograph Monitoring

Nodes:
- Run RTM records application service system
- Run RTM App
- Receive data from DT
- Write RTM records to IVS memory
- Update RTM records to ASP RTM system
- Backup/ Archive
- Send RTM records to ASP system
- ASP RTM system processes
- Delete RTM records from IVS memory
- Reports to jurisdiction
- Reports to Driver
- Reports to operator

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10.4 TARV RTM service elements

10.4.1 TARV RTM service element (SE) 1: Establish 'Remote tachograph monitoring' regulations, requirements, and approval arrangements

The *jurisdiction (4.25)* shall be responsible to define its requirements for its variant of the remote tachograph monitoring *application service (4.2),* obtain any legislation and/or regulations, and define the procedure for an *application service provider (4.3)* to gain approval for its instantiation of the *TARV RTM application service.*

10.4.2 TARV RTM SE2: Request system approval

The *application service provider (4.3)* shall seek approval for its instantiation of the remote tachograph monitoring application service from the *approval authority (regulatory) (4.7)* in accordance with the regime established by the *jurisdiction (4.25).*

10.4.3 TARV RTM SE3: User (operator) contracts with prime service provider

It shall be a prerequisite requirement for any potential vehicle *operator (4.30)* opting or being required to sign up for the *TARV RTM* application service that its regulated vehicles *(4.34)* are *TARV* equipped with a *TARV* compliant *IVS (4.22)* at point of manufacture or installed by a *prime service provider (4.31)*, and that there is a maintenance contract with a *prime service provider* for that equipment. (See ISO 15638-1 *TARV* framework and architecture).

10.4.4 TARV RTM SE4: User (operator) equips vehicle with a digital tachograph

It shall be a prerequisite for any potential vehicle *operator (4.30)* opting or being required to sign up for the *TARV RTM* application service that its regulated vehicles (4.34) are *TARV* equipped with a digital *tachograph (4.40)* at point of manufacture or installed by a *prime service provider (4.31)*, and that there is a maintenance contract with a *prime service provider (4.31)* for that equipment.

10.4.5 TARV RTM SE5: User contracts with application service provider

The *user (4.42)* (*operator (4.30)*) shall contract with an *application service provider (4.3)* who offers an approved *TARV RTM* application service to provide the *TARV RTM* application service to nominated vehicles.

10.4.6 TARV RTM SE6: application service provider uploads software into the TARV equipped vehicles of the operator

The *service provider (4.37))* shall upload and commission the on-board *TARV RTM app (4.1)* software into the *TARV* equipped vehicles of the *operator (4.30).*

10.4.7 TARV RTM SE7: Create `RTMData` file

When the ignition of the *regulated vehicle (4.34)* is turned on, the *TARV RTM app (4.1)* in the data library of the *IVS (4.22)* shall be instigated.

The *app (4.1)* shall first create a `RTMData` file and shall name the file

<YYMMDD><hhmmss><vehicle registration number><' *RTM*Data'>

and shall record the IVS ID, as specified in ISO 15638-5, as the first data element in the file, followed by a comma

as

<IVS Unique identity><,>

See 10.5 and Table 2 below.

10.4.8   TARV RTM SE8: Recording of digital tachograph data

At intervals determined by the application service *app (4.1)*, the *app* shall obtain a stream of data from the digital *tachograph (4.40)* ('pull') or the *tachograph* shall send a stream of data ('push') to the *IVS (4.22)*.

The *IVS (4.22)* shall update the '*RTMData*' file adding the new data to the end of the file, in the format <'start'><tachographdata><'END'>

The length of the data file 'RTMdata' shall be recorded as a numeric value representing a number of bytes (octets).

10.4.9   TARV RTM SE9: Sending digital tachograph data to application service provider

At time intervals determined by the on-board *TARV RTM app (4.1)*, the *IVS (4.22)* shall send the '*RTMData*' file to the *TARV RTM application service provider (4.3)* system via a wireless communication supported by the *IVS* and *application service provider* system as:

<START><LENGTH>< RTMdata file><RTMData><END>

.
On successful receipt of the *TARV RTM* file the *application service provider (4.3)* system shall send an ACKnowledgement <RTX> to the *IVS (4.22)*. On receipt of the ACKnowledgement <RT
x> the *IVS* shall clear the data held within the '*RTMData*' file and start to repopulate the '*RTMData*' file with data as defined by the *TARV RTM app (4.1)*.

If an ACKnowledgement is not received within X seconds (X as determined by the Jurisdiction) of sending the data the *TARV RTM app (4.1)* shall attempt to resend the data and shall continue to do so at intervals determined by the *specification (4.39)* of the *TARV RTM* application service approved by the *approval authority (regulatory) (4.7)* until the data has been successfully sent and ACKnowledged.

Whenever the *regulated vehicle (4.34)* ignition is switched to OFF, the on-board *TARV RTM app (4.1)* shall append a record <Time><'OFF'> to the '*RTMData*' file and the *IVS (4.22)* shall send the file to the *TARV RTM application service provider (4.3)* system via a wireless communication supported by the *IVS* and *application service provider* system.

.
On successful receipt of the *TARV RTM* file containing the end data(<Time><'OFF'>) the *application service provider (4.3)* system shall send an ACKnowledgement <RXX> to the *IVS (4.22)*, and unless otherwise instructed by the *specification (4.39)* of the application service approved by the *approval authority (regulatory) (4.7)*, on receipt of the ACKnowledgement <RXX> the *IVS* shall delete the '*RTMData*' file from its memory. And the *TARV RTM app (4.1)* shall terminate.

Because of the titling regime defined above, each *TARV RTM* file is uniquely identifiable by the host *TARV RTM* application service when it is received.

The manner in which the application service uses the information captured and forwarded to it by the *IVS (4.22)* ('*RTMData*' files) to perform the *application service (4.2)*, and the method of reporting to the *jurisdiction (4.25)* and *operator (4.30)* is outside of the scope of this part of ISO 15638 shall be the subject of definition by the *jurisdiction* and the *application service provider (4.3)*.

10.4.10   TARV RTM SE10: 'Interrogated' request for tachograph data

10.4.10.1   An interrogating ITS-station shall request specific data as determined in ISO15638-6 clauses 7.1 and 8.1.2.

10.4.10.2   In the event that the IVS of a vehicle receives a wireless interrogation requesting the RTM data, the interrogator shall also provide at the time of the request, a unique 8 byte reference number (URef), and a destination IPv6 address (ReqDest) where it requests the data to be sent.

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10.4.10.3   On receipt of the request the IVS shall acknowledge the request with the appropriate ACKnowledgement defined in 8.3.5 of ISO15638-6, <T>, which acknowledges that a request for RTM data has been received.

10.4.10.4   The IVS shall then close the communication session.

10.4.10.5   The IVS shall then open a new communication session using an available and appropriate CALM wireless medium.

10.4.10.6   The IVS shall then send the RTM datafile to a predetermined destination IPv6 (internet) address that has previously been stored in the memory of the data pantry by its ASP, together with the URef and ReqDest provided by the interrogator.

10.4.10.7   On successful receipt of the data, the recipient at the predetermined destination IPv6 address shall send an acknowledgement <RTX> to the IVS.

10.4.10.8   On receipt of the acknowledgement <RTX> the IVS shall close its communication session.

10.4.10.9   The ASP shall be responsible to verify that the interrogation is legitimate, appropriate and from an accepted source, and having verified this, shall be responsible to send the data to the interrogator requested IPv6 address. The means and detail of how this is achieved is outside the scope of this part of ISO 15638.

10.4.10   TARV RTM SE11: End of session

At the end of the driving *session (4.38)* when the *driver (4.15)* turns the digital *tachograph (4.40)* off, or the ignition of the *regulated vehicle (4.34)* is switched to OFF, on receipt of this information the *IVS (4.22)* shall ensure whenever possible that the *application service provider (4.3)* system is updated via a wireless connection from the *IVS* (see 10.4.8 above).

If it is not possible for the *IVS (4.22)* to update the *application service provider (4.3)* system at this point in time, the *IVS* shall update the *application service provider* system at the earliest opportunity (for example when the *regulated vehicle (4.34)* ignition is next switched on).

10.5 Generic TARV RTM data naming, content and quality

The data content of the *tachograph (4.40)* data shall be as defined by the application service/tachometer design.

The '*RTM*Data' file shall be titled and populated as shown in Table 2

Table 2 — formal data content of a TARV RTM record

FILE TYPE		Format of file name	Notes/Source
RTM	Mandatory	<YYMMDD><hhmmss><vehicle registration number><' *RTM*Data'> Example 110316 070603 GB 1 KV76WRR *RTM*Data As: 110316070603KV76WRR*RTM*Data	Clause 10.4.7 ([*RTM*Data file])
Number	Data concept name	Use	Format	Notes/Source
*RTM*001	IVS ID	Mandatory	AN (9)	IVS identifier as defined in ISO 15638-5

RTM002	Digital tachograph data	Mandatory	Data as supplied by digital tachograph <END>	Digital tachograph

The length of the RTMdata file shall be recorded as <LEN><nnnnn> where 'nnnn' represents a number of bytes (octets).

In the event of an interrogation request for RTM data the URef and DatReq shall be defined as:

Number	Data concept name	Use	Format	Notes/Source
RTM0003	Uref	Mandatory	AN (8)	An 8 byte reference provided by the interrogator requesting the data. The alphanumeric or binary content of which is unspecified by ISO 15638, but is intended to be used by the interrogator to provide a unique reference to its request for data
RTM004	ReqDes	Mandatory	35 Bytes	Requested Destination IPv6 address for the data to be sent as: scheme://domain:port/path?query_string#fragment_id i.e.: The scheme name (commonly called protocol), followed by :// then, depending on scheme, a domain name (alternatively, IP address) : a port number, and / the path of the resource to be fetched or the program to be run. If the scheme name is http, the 'http://' is assumed e.g: www.example.com/path/to/name https://example.com/47.35868 telnet://192.0.2.16:80/

10.6 TARV RTM application service specific provisions for quality of service

The integrity of the data is important, and other sensors as well as parameters may then be required based on the approaches and techniques used to provide assurance of the quality of the data. The generic quality of service provisions for the service elements specified in 10.4 are defined in ISO 15638-6 and ISO 15638-5.

Instantiation specific requirements shall be part of the regulation of the *jurisdiction (4.25)*. However, in defining such requirements *jurisdictions* shall wherever possible, use performance based or functionally *specifications (4.39)* in order to avoid locking requirements into technologies that will become obsolete.

NOTE   Having prescribed integrity and its parameters into an operational system, it is harder to move to other integrity indicators when new technologies come along.

See also Clause 9 above for general quality of service requirements.

10.7 TARV RTM application service specific provisions for test requirements

There are no specific provisions for test requirements specified in this Technical Specification version of this document.

10.8 TARV RTM application specific rules for the approval of IVSs and 'Service Providers'

Shall be as specified in ISO 15638-6, subclause 9.16.

11 Declaration of patents and intellectual property

This part of ISO 15638 contains no known patents or intellectual property other than that which is implicit in the media standards referenced herein and in ISO 15638-2. While the *CALM* standards themselves are free of patents and intellectual property, *CALM* in many cases relies on the use of public networks and IPR exists in many of the public network media standards. The reader is referred to those standards for the implication of any patents and intellectual property.

Application services *(4.2)* specified within this part of ISO 15638 and ISO 15638-7 contain no direct patents nor intellectual property other than the copyright of ISO. However, national, regional or local instantiations of any the applications services defined in this part of ISO 15638 and ISO 15638-7, or of the generic vehicle information defined in ISO 15638-5, the security requirements contained in ISO 15638-4, or the requirements of ISO 15638-3, may have additional requirements which may have patent or intellectual property implications. The reader is referred to the regulation regime of the jurisdiction *(4.25)* and its regulations for instantiation in this respect.

Annex A
(informative)

Independent testing of the protocols defined in this Part of ISO 15638

A.1 Objectives

To test the validity of TARV standards it is necessary to simulate the TARV transactions. These are of two types

I. Instigation

    a) The IVS of a vehicle establishes a new communication using one of (and must be tested for each of) several wireless media defined below.

    b) The IVS of a vehicle internally triggers a requirement to send a packet of data to a predetermined destination IPv6 (internet) address

    c) The vehicle sends the datafile to the predetermined destination IPv6 (internet) address

    d) Recipient address sends acknowledgement

    e) IVS closes the communication on receipt of acknowledgement

II. Interrogation

III. The IVS of a vehicle receives a wireless interrogation requesting a packet of data.

    a) The IVS of a vehicle is switched on but is not connected

    b) The IVS of a vehicle receives a wireless interrogation requesting a packet of data.

    c) On receipt it acknowledges the request (ACK)

    d) It closes the communication

    e) Opens a new communication session using one of (and must be tested for each of) several wireless media defined below.

    f) Sends the datafile to a predetermined destination IPv6 (internet) address

    g) Recipient address sends acknowledgement

    h) IVS Closes the communication on receipt of acknowledgement

These scenarios need to be tested using each of 2G, 3G, WiFi, 5.9GHz (IEEE802.11) using the same data

A number of different datafiles (of different length) and acknowledgements need to be sent, which differ according to the application service. Each of the sequences defined below need to be tested.

In respect of 'interrogation' scenarios the ability to receive the interrogation on one medium (esp. 5.9 GHz) and to instigate the subsequent message using a different medium needs to be tested

Preconditions, Assumptions and Simulations

1. The s.u.t concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards.)

2. CALM and media choice are assumed, and not s.u.t.

3. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, Mesh WiFi, 5.9GHz (IEEE 802.11p)

4. The means to trigger the sending of a message from the vehicle is a function of IVS design, not s.u.t., therefore may be simulated

5. The destination address is intended to be an IPv6 address, but may be simulated with an IPv4 address as this is an internet issue, not s.u.t.
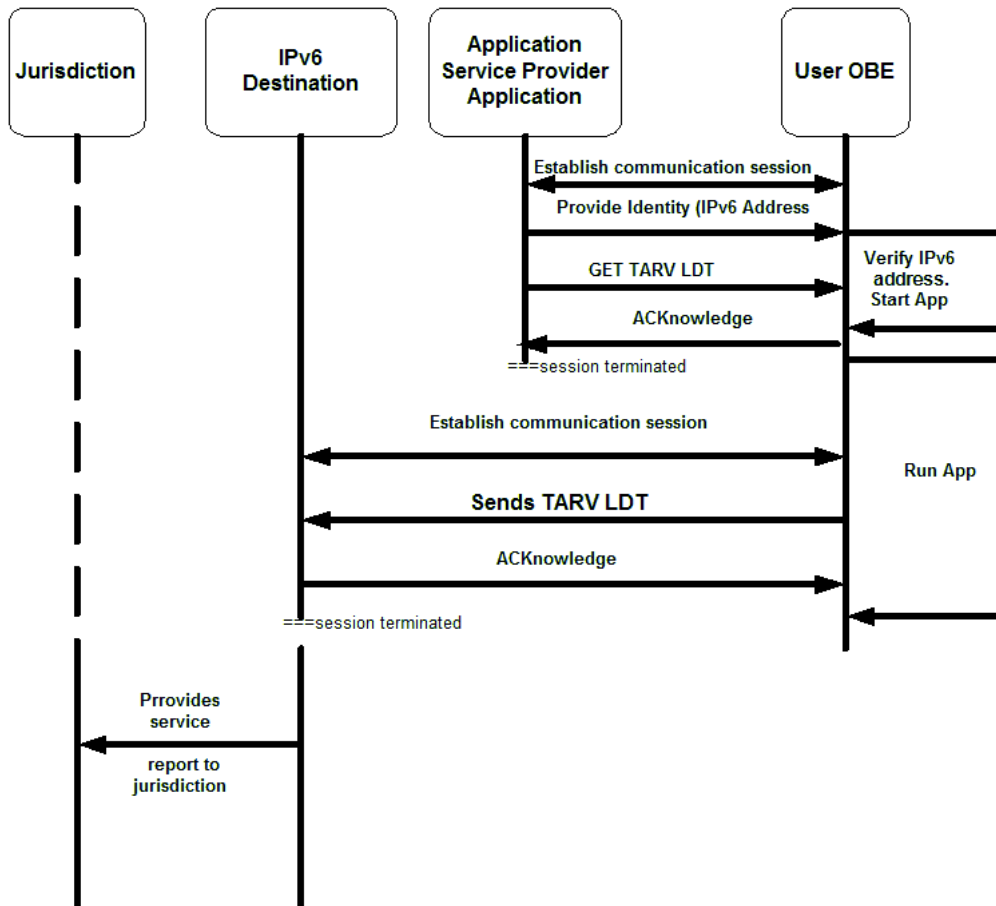
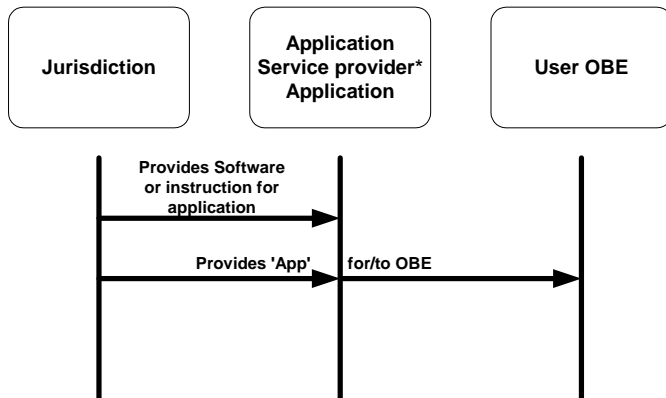**Figure A.1 — Communications sequences to obtain TARV LDT**

Application Services where the verity of the communication needs to be physically tested

|	
VAM	*vehicle access monitoring*
RTM	*remote electronic tachograph monitoring*
EMS	*emergency messaging system*
DWR	*driver work records* (work and rest hours compliance)
VMM	*vehicle mass monitoring*
MRC	*'mass' data for regulatory control and management (no test - data as VMM)*
VAC	*vehicle access control (no test - data as VAM)*
VLM	*vehicle location monitoring*
VSM	*vehicle speed monitoring*
CLM	*consignment and location monitoring*
ADR	*Accord Dangereuses par Route (Dangerous Goods) monitoring*
VPF	*vehicle parking facilities*

Test Sequences

Each of the following application service data provision sequences needs to be successfully sent:

A.2 TEST SCRIPT 2 Core DataSERVICE : VAM VEHICLE ACCESS MONITORING (CoreData)
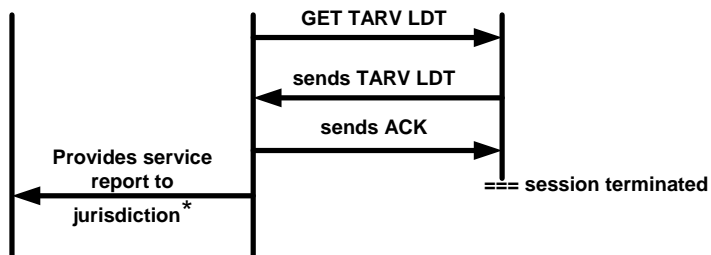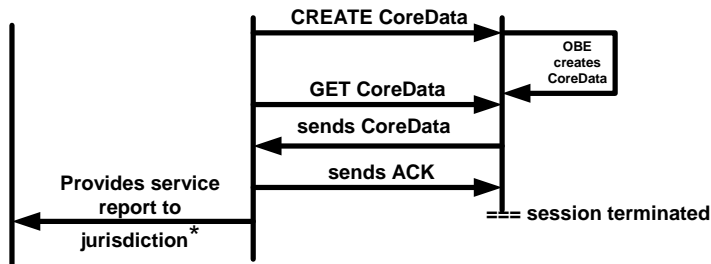
Figure A.2 — Sequences to obtain *TARV LDT* and CoreData

IVS instigates a communication session using 2G media to predetermined destination IP address

```
AS          API      IPv6 address
As           AS      00000000 00000000 xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx
Example: PSP      128..16511   1050:0000:0000:0000:0005:0600:300c:326b
```

vehicle unique identifier Filename<44EMV03WRRCore Data >

IVS sends file named <44EMV03WRRCore Data **>**

AaaSs0

0

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XXXX:XXXX:XXXX:XXXX:XXXX:XXXX:XXXX:XXXX
128..16511
1G1JF27W8GJ178227
000000
1297339499
0x0A5D3770
0x027E2938
0000
Sat8
0
123
Ign 1
000
000
010326 UKPeter Jones 01,02,03a,h1   120325
010326 124538   Peter Jones 01,02,h1   120325

Using <CR> or ',' as a datafied separator

CTP 2.1.1   Instigated Core Data using 2G

SUT Reference	Instigated send of Core Data using 2G
CTP/2.1.1 .	
SUT Test Objective	The IVS of a vehicle establishes a new communication using one of (and must be tested for each of) several wireless media defined below. The IVS of a vehicle internally triggers a requirement to send a packet of data to a predetermined destination IPv6 (internet) address The vehicle sends the datafile to the predetermined destination IPv6 (internet) address Recipient address sends acknowledgement IVS closes the communication on receipt of acknowledgement
CTP Origin	CSI
Reference requirement	ISO 15638-8 and ISO 15638-6 Clause 8.3.4.3
Initial Conditions	The s.u.t concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards.) CALM and media choice are assumed and not s.u.t. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5.9GHz (IEEE802.11p) The means to trigger the sending of a message from the vehicle is a function of IVS design, not s.u.t., therefore may be simulated The destination address is intended to be an IPv6 address, but may be simulated with an IPv4 address as this is an internet issue, not s.u.t.

Stimulus and expected behaviour

Test point		Tester action	Pass Condition
2.1.1.1	1	IVS instigates a communication session using selected media (2G) to predetermined destination IP address	**Session established**
2.1.1.2	2	IVS sends file named <44EMV03WRRCore Data>	**File sent and arri correctly at destinati**

		<START> <AaaSs0,,0,xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx,128..16511,1G1JF27W8GJ178227,000000,1297339499,0x0A5D3770,0x027E2938,0000,Sat8,0,123,Ign 1,000,000,010326 UKPeter Jones,01,02,03a,h1,120325,010326 124538, Peter Jones 01,02,h112032,6,437,2,15,1015003,110303><END>		
2.1.1.3	3	Destination address sends ACK <CDX>		
2.1.1.4	4	IVS receives ACK <CDX>	**File received and ACK <CDX> sent**	
2.1.1.5	5	IVS closes communication session	**Communication session closed**	
			If ALL individual pass conditions listed in this column above have been met **THEN CTP PASS** **ELSE CTP FAIL**	

.

TEST RESULT: CTP 2.1.1	PASS / FAIL	Date: 28th June 2102
Signature/initials	PASS	**innovITS** ADVANCE k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK Tel: +44 (0)7730 922 810 Web: www.innovits.com/advance

CTP 2.1.2　Interrogated Core Data using 2G

SUT Reference	Interrogated send of Core Data using 2G
CTP/2.1.2	
SUT Test Objective	The IVS of a vehicle receives a wireless interrogation requesting a packet of data. The IVS of a vehicle is switched on but is not connected The IVS of a vehicle receives a 2G wireless interrogation requesting a packet of data. On receipt it acknowledges the request (ACK) It closes the communication Opens a new communication session using one of (and must be tested for each of) several wireless media defined below. Sends the datafile to a predetermined destination IPv6 (internet) address Recipient address sends acknowledgement IVS Closes the communication on receipt of acknowledgement
CTP Origin	CEN
Reference requirement	**ISO 15638-8 and ISO 15638-6 Clause 8.3.4.3**
Initial Conditions	The s.u.t concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards.) CALM and media choice are assumed and not s.u.t. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5.9GHz (IEEE802.11p) The means to trigger the sending of a message from the vehicle is a function of IVS design, not s.u.t., therefore may be simulated The destination address is intended to be an IPv6 address, but may be simulated with an IPv4 address as this is an internet issue, not s.u.t.

Stimulus and expected behaviour

Test point		Tester action	Pass Condition
2.1.2.1	1	session connected (incoming call)	**Call in progress**
2.1.2.2	2	Caller sends data request command (GPRS, EDGE etc) GET CD	**Data request sent**
2.1.2.3	3	IVS acknowledges request by returning ACKnowledgement <D>	**ACK <D> received**
2.1.2.4	4	IVS closes communication session	**Communication session closed**
2.1.2.5	5	IVS instigates a communication session using selected media to predetermined destination IP address	**Communication session successfully opened**
2.1.2.5	6	IVS sends file named <44EMV03WRRCore Data> <START> <AaaSs0,,0,xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx,128..16511, 1G1JF27W8GJ178227,000000,1297339499,0x0A5D3770,0x027 E2938,0000,Sat8,0,123,Ign 1,000,000,010326 UKPeter Jones,01,02,03a,h1,120325,010326 124538, Peter Jones 01,02,h1120325,6,437,2,15,1015003,110303><END>	**File sent and arrives correctly at destination**
2.1.2.6	7	Destination address sends ACK <CDX>	
2.1.2.7	8	IVS receives ACK <CDX>	**File received and ACK <CDX> sent**
2.1.2.8	9	IVS closes communication session	**Communication session closed**
			If ALL individual pass conditions listed in this column above have been met **THEN CTP PASS** **ELSE CTP FAIL**

.

TEST RESULT: CTP 2.1.2	**PASS / FAIL**	**Date: 28th June 2102**
Signature/initials	**PASS**	innovITS ADVANCE k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK **Tel: +44 (0)7730 922 810** Web: www.innovits.com/advance

CTP 2.1.3   Interrogated Core Data using 5.9GHz and responding using 2G or 3G

SUT Reference	Interrogated Core Data using 5.9 GHz and send of Core Data using 2G or 3G
CTP/2.1.3	
SUT Test Objective	The IVS of a vehicle receives a wireless interrogation requesting a packet of data.
	The IVS of a vehicle is switched on but is not connected
	The IVS of a vehicle receives a 5.9GHz (IEEE 802.11p) wireless interrogation requesting a packet of data.
	On receipt it acknowledges the request (ACK)
	It closes the communication
	Opens a new communication session using 2G or 3G.
	Sends the datafile to a predetermined destination IPv6 (internet) address
	Recipient address sends acknowledgement
	IVS Closes the communication on receipt of acknowledgement
CTP Origin	CEN
Reference requirement	**ISO 15638-8 and ISO 15638-6 Clause 8.3.4.3**
Initial Conditions	The s.u.t concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards.)
	CALM and media choice are assumed and not s.u.t.
	The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5.9GHz (IEEE802.11p)
	The means to trigger the sending of a message from the vehicle is a function of IVS design, not s.u.t., therefore may be simulated
	The destination address is intended to be an IPv6 address, but may be simulated with an IPv4 address as this is an internet issue, not s.u.t.

Stimulus and expected behaviour

Test point		Tester action	Pass Condition
2.1.3.1	1	session connected (incoming call) using 5.9 Ghz (IEEE 802.11p)	**Call in progress**

2.1.3.2	2	Caller sends data request command GET CD	Data request sent
2.1.3.3	3	IVS acknowledges request by returning ACKnowledgement <D>	ACK <D> received
2.1.3.4	4	IVS closes communication session	Communication session closed
2.1.3.5	5	IVS instigates a communication session using 2G or 3G	Communication session successfully opened
2.1.3.5	6	IVS sends file named <44EMV03WRRCore Data> <START> <AaaSs0,,0,xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx,128..16511, 1G1JF27W8GJ178227,000000,1297339499,0x0A5D3770,0x027 E2938,0000,Sat8,0,123,Ign 1,000,000,010326 UKPeter Jones,01,02,03a,h1,120325,010326 124538, Peter Jones 01,02,h1120325,6,437,2,15,1015003,110303><END>	File sent and arrives correctly at destination
2.1.3.6	7	Destination address sends ACK <CDX>	
2.1.3.7	8	IVS receives ACK <CDX>	File received and ACK <CDX> sent
2.1.3.8	9	IVS closes communication session	Communication session closed
			If ALL individual pass conditions listed in this column above have been met THEN CTP PASS ELSE CTP FAIL

.

TEST RESULT: CTP 2.1.3	PASS / FAIL	Date: 28th June 2102
Signature/initials	**PASS**	innovITS ADVANCE k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK **Tel: +44 (0)7730 922 810** Web: www.innovits.com/advance

CTP 2.2.1 Instigated Core Data using 3G

SUT Reference	Instigated send of Core Data using 3G
CTP/2.2.1	
SUT Test Objective	The IVS of a vehicle establishes a new communication using one of (and must be tested for each of) several wireless media defined below.
	The IVS of a vehicle internally triggers a requirement to send a packet of data to a predetermined destination IPv6 (internet) address
	The vehicle sends the datafile to the predetermined destination IPv6 (internet) address
	Recipient address sends acknowledgement
	IVS closes the communication on receipt of acknowledgement
CTP Origin	CSI
Reference requirement	**ISO 15638-8 and ISO 15638-6 Clause 8.3.4.3**
Initial Conditions	The s.u.t concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards.)
	CALM and media choice are assumed and not s.u.t.
	The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5.9GHz (IEEE802.11p)
	The means to trigger the sending of a message from the vehicle is a function of IVS design, not s.u.t., therefore may be simulated
	The destination address is intended to be an IPv6 address, but may be simulated with an IPv4 address as this is an internet issue, not s.u.t.

Stimulus and expected behaviour

Test point		Tester action	Pass Condition
2.2.1.1	**1**	IVS instigates a communication session using selected media (3G) to predetermined destination IP address	**Session established**
2.2.1.2	**2**	IVS sends file named	**File sent and arrives correctly at destination**

		<44EMV03WRRCore Data> <START> <AaaSs0,,0,xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx,128..16511,1G1JF27W8GJ178227,000000,1297339499,0x0A5D3770,0x027E2938,0000,Sat8,0,123,Ign 1,000,000,010326　　　　　UKPeter Jones,01,02,03a,h1,120325,010326 124538, Peter Jones 01,02,h1120325,6,437,2,15,1015003,110303><END>	
2.2.1.3	3	Destination address sends ACK <CDX>	
2.2.1.4	4	IVS receives ACK <CDX>	**File received and ACK <CDX> sent**
2.2.1.5	5	IVS closes communication session	**Communication session closed**
			If ALL individual pass conditions listed in this column above have been met **THEN CTP PASS** **ELSE CTP FAIL**

.

TEST RESULT: CTP 2.2.1	**PASS / FAIL**	**Date: 28th June 2102**
Signature/initials	**PASS**	innovITS ADVANCE k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK **Tel: +44 (0)7730 922 810** Web: www.innovits.com/advance

CTP 2.2.2   Interrogated at 5.9 GHz and send of Core Data using 3G

SUT Reference	5.9 GHz Interrogated and send of Core Data using 3G
CTP/2.2.2	
SUT Test Objective	The IVS of a vehicle receives a wireless interrogation requesting a packet of data. The IVS of a vehicle is switched on but is not connected The IVS of a vehicle receives a wireless interrogation requesting a packet of data. On receipt it acknowledges the request (ACK) It closes the communication Opens a new communication session using one of (and must be tested for each of) several wireless media defined below. Sends the datafile to a predetermined destination IPv6 (internet) address Recipient address sends acknowledgement IVS Closes the communication on receipt of acknowledgement
CTP Origin	CEN
Reference requirement	**ISO 15638-8 and ISO 15638-6 Clause 8.3.4.3**
Initial Conditions	The s.u.t concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards.) CALM and media choice are assumed and not s.u.t. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5.9GHz (IEEE802.11p) The means to trigger the sending of a message from the vehicle is a function of IVS design, not s.u.t., therefore may be simulated The destination address is intended to be an IPv6 address, but may be simulated with an IPv4 address as this is an internet issue, not s.u.t.

Stimulus and expected behaviour

Test point		Tester action	Pass Condition
2.2.2.1	1	session connected (incoming call) using 5.9 Ghz (IEEE 802.11p)	**Call in progress**

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2.2.2.2	2	Caller sends data request command GET CD	**Data request sent**
2.2.2.3	3	IVS acknowledges request by returning ACKnowledgement <D>	**ACK <D> received**
2.2.2.4	4	IVS closes communication session	**Communication session closed**
2.2.2.5	5	IVS instigates a communication session using selected media (2G or 3G) to predetermined destination IP address	**Communication session successfully opened**
2.2.2.5	6	IVS sends file named <44EMV03WRRCore Data> <START> <AaaSs0,,0,xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx,128..16511,1G1J F27W8GJ178227,000000,1297339499,0x0A5D3770,0x027E2938,000 0,Sat8,0,123,Ign 1,000,000,010326 UKPeter Jones,01,02,03a,h1,120325,010326 124538, Peter Jones 01,02,h1120325,6,437,2,15,1015003,110303><END>	**File sent and arrives correctly at destination**
2.2.2.6	7	Destination address sends ACK <CDX>	
2.2.2.7	8	IVS receives ACK <CDX>	**File received and ACK <CDX> sent**
2.2.2.8	9	IVS closes communication session	**Communication session closed**
			If ALL individual pass conditions listed in this column above have been met **THEN CTP PASS** **ELSE CTP FAIL**

.

TEST RESULT: CTP 2.2.2	**PASS / FAIL**	**Date: 28th June 2102**
Signature/initials	**PASS**	innovITS ADVANCE k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK **Tel: +44 (0)7730 922 810** Web: www.innovits.com/advance

CTP 2.3.1   Instigated Core Data using 802.11p (WAVE) 5.9 GHz

SUT Reference	Instigated Core Data using 802.11p (WAVE) 5.9 GHz
CTP/2.3.1	
SUT Test Objective	The IVS of a vehicle establishes a new communication using one of (and must be tested for each of) several wireless media defined below.

The IVS of a vehicle internally triggers a requirement to send a packet of data to a predetermined destination IPv6 (internet) address

The vehicle sends the datafile to the predetermined destination IPv6 (internet) address

Recipient address sends acknowledgement

IVS closes the communication on receipt of acknowledgement |
| **CTP Origin** | CSI |
| **Reference requirement** | **ISO 15638-8 and ISO 15638-6 Clause 8.3.4.3** |
| **Initial Conditions** | The s.u.t concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards.)

CALM and media choice are assumed and not s.u.t.

The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5.9GHz (IEEE802.11p)

The means to trigger the sending of a message from the vehicle is a function of IVS design, not s.u.t., therefore may be simulated

The destination address is intended to be an IPv6 address, but may be simulated with an IPv4 address as this is an internet issue, not s.u.t. |

Stimulus and expected behaviour

Test point		Tester action	Pass Condition
2.3.1.1	**1**	IVS instigates a communication session using selected media (5.9G) to predetermined destination IP address	**Session established**
2.3.1.2	**2**	IVS sends file named	**File sent and arrives correctly at destination**

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		<44EMV03WRRCore Data>

<START>
<AaaSs0,,0,xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx,128..1 6511,1G1JF27W8GJ178227,000000,1297339499,0x0A5D 3770,0x027E2938,0000,Sat8,0,123,Ign   1,000,000,010326 UKPeter   Jones,01,02,03a,h1,120325,010326   124538, Peter Jones 01,02,h1120325,6,437,2,15,1015003,110303>

<END> | |
2.3.1.3	3	Destination address sends ACK <CDX>	
2.3.1.4	4	IVS receives ACK <CDX>	**File received and ACK <CDX> sent**
2.3.1.5	5	IVS closes communication session	**Communication session closed**
			If ALL individual pass conditions listed in this column above have been met

THEN CTP PASS

ELSE CTP FAIL |

.

TEST RESULT	PASS / FAIL	Date: 28th June 2102
Signature/initials	**PASS**	innovITS ADVANCE
k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK
Tel: +44 (0)7730 922 810
Web: www.innovits.com/advance

CTP 2.3.2   Interrogated Core Data using 802.11p (WAVE) 5.9 GHz

SUT Reference	Interrogated send of Core Data using 802.11p (WAVE) 5.9 GHz
CTP/2.3.2	
SUT Test Objective	The IVS of a vehicle receives a wireless interrogation requesting a packet of data. The IVS of a vehicle is switched on but is not connected The IVS of a vehicle receives a wireless interrogation requesting a packet of data. On receipt it acknowledges the request (ACK) It closes the communication Opens a new communication session using one of (and must be tested for each of) several wireless media defined below. Sends the datafile to a predetermined destination IPv6 (internet) address Recipient address sends acknowledgement IVS Closes the communication on receipt of acknowledgement
CTP Origin	CEN
Reference requirement	**ISO 15638-8 and ISO 15638-6 Clause 8.3.4.3**
Initial Conditions	The s.u.t concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards.) CALM and media choice are assumed and not s.u.t. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5.9GHz (IEEE802.11p) The means to trigger the sending of a message from the vehicle is a function of IVS design, not s.u.t., therefore may be simulated The destination address is intended to be an IPv6 address, but may be simulated with an IPv4 address as this is an internet issue, not s.u.t.
Stimulus and expected behaviour	

Test point		Tester action	Pass Condition
2.3.2.1	1	session connected (incoming call) using 5.9 Ghz (IEEE 802.11p)	**Call in progress**

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2.3.2.2	2	Caller sends data request command GET CD	**Data request sent**
2.3.2.3	3	IVS acknowledges request by returning ACKnowledgement <D>	**ACK <D> received**
2.3.2.4	4	IVS closes communication session	**Communication session closed**
2.3.2.5	5	IVS instigates a communication session using 5.9GHz selected media to predetermined destination IP address	**Communication session successfully opened**
2.3.2.5	6	IVS sends file named <44EMV03WRRCore Data> <START> <AaaSs0,,0,xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx,128..16511,1G 1JF27W8GJ178227,000000,1297339499,0x0A5D3770,0x027E2938, 0000,Sat8,0,123,Ign 1,000,000,010326 UKPeter Jones,01,02,03a,h1,120325,010326 124538, Peter Jones 01,02,h1120325,6,437,2,15,1015003,110303><END>	**File sent and arrives correctly at destination**
2.3.2.6	7	Destination address sends ACK <CDX>	
2.3.2.7	8	IVS receives ACK <CDX>	**File received and ACK <CDX> sent**
2.3.2.8	9	IVS closes communication session	**Communication session closed**
			If ALL individual pass conditions listed in this column above have been met **THEN CTP PASS** **ELSE CTP FAIL**

.

TEST RESULT: CTP 2.3.2	**PASS / FAIL**	**Date: 28th June 2102**
Signature/initials	**PASS**	innovITS ADVANCE k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK **Tel: +44 (0)7730 922 810** Web: www.innovits.com/advance

CTP 2.4.1   Instigated Core Data using Mesh WiFi

SUT Reference	Instigated send of Core Data using Mesh WiFi
CTP/2.4.1	
SUT Test Objective	The IVS of a vehicle establishes a new communication using one of (and must be tested for each of) several wireless media defined below. The IVS of a vehicle internally triggers a requirement to send a packet of data to a predetermined destination IPv6 (internet) address The vehicle sends the datafile to the predetermined destination IPv6 (internet) address Recipient address sends acknowledgement IVS closes the communication on receipt of acknowledgement
CTP Origin	CSI
Reference requirement	**ISO 15638-8 and ISO 15638-6 Clause 8.3.4.3**
Initial Conditions	The s.u.t concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards.) CALM and media choice are assumed and not s.u.t. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5.9GHz (IEEE802.11p) The means to trigger the sending of a message from the vehicle is a function of IVS design, not s.u.t., therefore may be simulated The destination address is intended to be an IPv6 address, but may be simulated with an IPv4 address as this is an internet issue, not s.u.t.

Stimulus and expected behaviour

Test point		Tester action	Pass Condition
2.4.1.1	**1**	IVS instigates a communication session using selected media (Mesh WiFi) to predetermined destination IP address	**Session established**

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2.4.1.2	2	IVS sends file named <44EMV03WRRCore Data> <START> <AaaSs0,,0,xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx,128..165 11,1G1JF27W8GJ178227,000000,1297339499,0x0A5D3770, 0x027E2938,0000,Sat8,0,123,Ign 1,000,000,010326 UKPeter Jones,01,02,03a,h1,120325,010326 124538, Peter Jones 01,02,h1120325,6,437,2,15,1015003,110303> <END>	**File sent and arrives correctly at destination**
2.4.1.3	3	Destination address sends ACK <CDX>	
2.4.1.4	4	IVS receives ACK <CDX>	**File received and ACK <CDX> sent**
2.4.1.5	5	IVS closes communication session	**Communication session closed**
			If ALL individual pass conditions listed in this column above have been met **THEN CTP PASS** **ELSE CTP FAIL**
.			

TEST RESULT: CTP 2.4.1	**PASS / FAIL**	**Date: 28th June 2102**
Signature/initials	**PASS**	**innovITS** *ADVANCE* k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK **Tel: +44 (0)7730 922 810** Web: www.innovits.com/advance

CTP 2.4.2   Interrogated Core Data using Mesh WiFi

SUT Reference	5.9 GHz Interrogated and send of Core Data using Mesh WiFi
CTP/2.4.2	
SUT Test Objective	The IVS of a vehicle receives a wireless interrogation requesting a packet of data. The IVS of a vehicle is switched on but is not connected The IVS of a vehicle receives a wireless interrogation requesting a packet of data. On receipt it acknowledges the request (ACK) It closes the communication Opens a new communication session using one of (and must be tested for each of) several wireless media defined below. Sends the datafile to a predetermined destination IPv6 (internet) address Recipient address sends acknowledgement IVS Closes the communication on receipt of acknowledgement
CTP Origin	CEN
Reference requirement	**ISO 15638-8 and ISO 15638-6 Clause 8.3.4.3**
Initial Conditions	The s.u.t concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards.) CALM and media choice are assumed and not s.u.t. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5.9GHz (IEEE802.11p) The means to trigger the sending of a message from the vehicle is a function of IVS design, not s.u.t., therefore may be simulated The destination address is intended to be an IPv6 address, but may be simulated with an IPv4 address as this is an internet issue, not s.u.t.

Stimulus and expected behaviour

Test point		Tester action	Pass Condition
2.4.2.1	1	session connected (incoming call) using 5.9 Ghz (IEEE	**Call in progress**

		802.11p)	
2.4.2.2	2	Caller sends data request command (GPRS, EDGE etc) GET CD	**Data request sent**
2.4.2.3	3	IVS acknowledges request by returning ACKnowledgement <D>	**ACK <D> received**
2.4.2.4	4	IVS closes communication session	**Communication session closed**
2.4.2.5	5	IVS instigates a communication session using mesh WiFi selected media to predetermined destination IP address	**Communication session successfully opened**
2.4.2.5	6	IVS sends file named <44EMV03WRRCore Data> <START> <AaaSs0,,0,xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx,128..165 11,1G1JF27W8GJ178227,000000,1297339499,0x0A5D3770, 0x027E2938,0000,Sat8,0,123,Ign 1,000,000,010326 UKPeter Jones,01,02,03a,h1,120325,010326 124538, Peter Jones 01,02,h1120325,6,437,2,15,1015003,110303><END>	**File sent and arrives correctly at destination**
2.4.2.6	7	Destination address sends ACK <CDX>	
2.4.2.7	8	IVS receives ACK <CDX>	**File received and ACK <CDX> sent**
2.4.2.8	9	IVS closes communication session	**Communication session closed**
			If ALL individual pass conditions listed in this column above have been met **THEN CTP PASS** **ELSE CTP FAIL**

.

TEST RESULT: CTP 2.4.2	**PASS / FAIL**	**Date: 28th June 2102**
Signature/initials	**PASS**	innovITS ADVANCE k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK **Tel: +44 (0)7730 922 810** Web: www.innovits.com/advance

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